

DECISION No 24/2020 OF THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS

of 2 October 2020

on the methodology for the European resource adequacy assessment

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators¹, and, in particular, Article 9(1)(a) thereof,

Having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity² and, in particular, paragraphs (3) and (7) of Article 23 and Article 27(3) thereof,

Having regard to the outcome of the consultations with the European Network of Transmission System Operators for Electricity ('ENTSO-E'), Member States, the Electricity Coordination Group (the 'ECG') and relevant stakeholders,

Having regard to the outcome of the consultation with ACER's Electricity Working Group (the 'AEWG'),

Having regard to the favourable opinion of the Board of Regulators of 25 September 2020, delivered pursuant to Article 22(5)(a) of Regulation (EU) 2019/942,

Whereas:

1. INTRODUCTION

(1) Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity (the 'Electricity Regulation') establishes rules to ensure the functioning of the internal

¹ OJ L 158, 14.6.2019, p. 22-53.

² OJ L 158, 14.6.2019, p. 54-124.



market for electricity. This includes a requirement for a coherent European resource adequacy assessment (ERAA) based on a consistent EU-wide methodology (the 'ERAA Methodology') in order to establish realistic levels of supply security and to provide an objective basis to identify resource adequacy concerns in the EU Member States.

- (2) Pursuant to Article 23(3) of the Electricity Regulation, ENTSO-E shall develop a proposal for ERAA Methodology based on principles set in Article 23(5) of the same Regulation, and shall submit it to the ECG and ACER by 5 January 2020.
- (3) Pursuant to Article 27 of the Electricity Regulation, within three months of the date of receipt of the proposal for the ERAA Methodology from ENTSO-E, ACER shall either approve or amend it. In the latter case, ACER shall consult ENTSO-E before approving the amended proposal.
- (4) The present Decision follows ENTSO-E's submission of a proposal for the ERAA Methodology, seeking approval by ACER; Annex I to this Decision sets out the ERAA Methodology as decided by ACER. Annex II to this Decision describes a summary and evaluation of answers received within the public consultation conducted by ACER (for information only). Annex III gathers ENTSO-E's comments and proposed changes based on ACER's 22 July preliminary views (for information only).

2. PROCEDURE

- (5) On 4 May 2020, ENTSO-E submitted to ACER a proposal for ERAA Methodology in accordance with Article 23(3) of the Electricity Regulation (the 'ERAA Proposal').
- (6) On 6 May 2020, ACER launched a public consultation on the ERAA Proposal, inviting Member States, the ECG and relevant stakeholders to submit their comments by 27 May 2020. In its consultation document, ACER asked stakeholders to provide views on the text of the ERAA Proposal³. Annex II to this Decision sets out, for information, a summary and evaluation of consultation responses.
- (7) From 5 May until 16 August 2020, ACER engaged with Member States, national regulatory authorities ('NRAs'), the European Commission, ENTSO-E and relevant stakeholders through conference calls and electronic exchanges of documents with the aim to:
 - (a) analyse the ERAA Proposal to achieve a common understanding of the various elements therein, taking into consideration the legal requirements stemming from the European legal framework;

³PC 2020 E 10 - Joint public consultation on methodologies for assessing electricity resource adequacy. This consultation also covered the ENTSO-E proposal for a methodology for calculating the value of lost load, cost of new entry and reliability standard (VOLL/CONE/RS). For a summary and evaluation of stakeholders' responses on the VOLL/CONE/RS proposal, see ACER Decision No 23/2020, Annex II.



- (b) discuss current practices in Member States;
- (c) discuss the comments received during the public consultation (see section 5.1); and
- (d) extensively discuss with ENTSO-E and the NRAs substantive changes and necessary changes, including editorial ones, to the ERAA Proposal (see section 6.6).
- (8) In particular, the following steps were taken between May and July 2020:

5 May: conference call with ENTSO-E;

6 May: electronic exchange of documents, for consideration, with the ECG,

NRAs, the European Commission;

8 May: conference call with the European Commission;

20-13 May: conference call with the NRAs;

20 May: conference call with the European Commission; electronic exchange of

documents, for consideration, with ENTSO-E;

25-26 May: conference call with the NRAs;

9 June: conference call and electronic exchange of documents, for

consideration, with the NRAs;

12 June: conference call with the NRAs;

16 June: electronic exchange of documents, for consideration, with the NRAs;

17 June: conference call with the NRAs;

18 June: electronic exchange of documents, for consideration, with ENTSO-E

and the NRAs; conference call with the NRAs;

24 June: conference call with the NRAs; conference call with ENTSO-E;

30 June: conference call with the NRAs;

3 July: electronic exchange of documents, for consideration, with the European

Commission, NRAs and ENTSO-E;

8 July: conference call with the NRAs;

20 July: conference call with ENTSO-E;

22 July: electronic exchange of documents, for consideration, with the NRAs and

ENTSO-E; and

27 July: electronic exchange of documents, for consideration, with ENTSO-E

and the ECG.

3. ACER'S COMPETENCE TO DECIDE ON THE PROPOSAL

(9) Pursuant to Article 9(1)(a) of Regulation (EU) 2019/942, paragraphs (3) and (7) of Article 23 and Article 27(3) of the Electricity Regulation, ACER shall amend, where



necessary, and approve the ENTSO-E Proposal within three months of the date of its receipt.

(10) Since ENTSO-E submitted the ERAA Proposal on the basis of Article 23(3) of the Electricity Regulation, ACER is competent to decide on this proposal according to Article 9(1)(a) of Regulation (EU) 2019/942, Article 23(7) and Article 27(3) of the Electricity Regulation.

4. SUMMARY OF THE PROPOSAL

(11) The ERAA Proposal submitted to ACER⁴ consists of the following elements:

The 'Whereas' section;

Articles 1 and 2 include general provisions on the subject matter and

scope, and definitions and interpretation;

Article 3 contains general provisions and requirements on

scenarios and sensitivities to analyse in the European

resource adequacy assessments (the 'ERAA');

Article 4 describes how to perform the ERAA;

Article 5 contains the requirements and the procedures for

collecting data for the ERAA;

Article 6 describes the requirements and the procedures for

performing the economic viability assessments within

the ERAA;

Article 7 describes output and results of the ERAA;

Article 8 outlines the interaction with stakeholders in the

different steps of the ERAA process;

Article 9 explains how to carry out the ERAA process;

Article 10 sets out the implementation of the ERAA Methodology;

Article 11 refers to the language of the ERAA Methodology;

Appendix 1 contains a glossary of some acronyms used in the ERAA

Methodology;

Appendix 2 contains a high-level information flow scheme linking

the ERAA with seasonal and short-term adequacy

⁴ In this section, and unless otherwise described, Article numbers relate to the ENTSO-E Proposal as submitted to ACER on 4 May 2020.



assessments, as referred to in Articles 8 and 9 of Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector⁵; and

Appendix 3

includes a high-level business process diagram for carrying out resource adequacy assessments.

5. SUMMARY OF THE OBSERVATIONS RECEIVED BY ACER

5.1. Public consultation

(12) Responses to the public consultation (see paragraph (6) above) are compiled in Annex II to this Decision.

5.2. Consultation of ENTSO-E and Member States

- (13) ACER consulted ENTSO-E and the Member States (through the ECG) on its preliminary position on the ERAA methodology. The feedback received is summarised by ACER in paragraphs (14)-(26). The full version of ENTSO-E's response can be found in Annex III.
- (14) ENTSO-E and some Member States highlighted that it is a Member State's right to determine the general structure of its security of supply, in line with Article 194(2) of the Treaty on the Functioning of the European Union.
- (15) ENTSO-E and some Member States requested that the ERAA accurately reflects the regulatory distortions expected to impact resource adequacy concerns. Some Member States requested that the ERAA accurately reflects Member States' actions pursuant to Article 10(5) of the Electricity Regulation and implementation plans pursuant to Article 20(3) of the Electricity Regulation. ENTSO-E and some Member States highlighted that it is a Member State's prerogative to develop such implementation plans.
- (16) ENTSO-E and some Member States expressed concerns about the use of balancing reserves (especially frequency containment reserves and frequency restoration reserves) or other out-of-market measures for resource adequacy purposes. They also highlighted that the ERAA Methodology should properly reflect the operating rules and requirements related to strategic reserves.
- (17) ENTSO-E and some Member States expressed concerns about the truncation of climate years to 30 years for central reference scenarios (in case no detailed climate

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⁵ OJ L 158, 14.6.2019, p. 1.



modelling approach is available) because it may lead to underestimate extreme weather events.

- (18) ENTSO-E and some Member States did not support optional sensitivity analyses reflecting variations on capacity mechanism structures.
- (19) ENTSO-E expressed concerns about the requirement to reflect, where possible and applicable, the attractiveness for capacity resources to be available when energy not served is likely to occur.
- (20) ENTSO-E mentioned that ERAA should not reflect the impact of some measures (e.g. the introduction of a shortage pricing function for balancing energy) described in Article 20(3) of the Electricity Regulation.
- (21) Some Member States suggested to ensure consistency between the VOLL and the harmonised maximum clearing price modelled in the ERAA methodology, e.g. by defining a harmonised fixed maximum clearing price equal to the average VOLL.
- (22) ENTSO-E and some Member States requested more methodological flexibility to model hedging and risk management when assessing the economic viability of capacity resources. Another Member State welcomed the inclusion of additional revenues from peak prices in the economic viability assessment.
- (23) Some Member States welcomed the addition of transparency requirements. However, ENTSO-E mentioned that some transparency requirements could lead to an excessive burden on ENTSO-E and to confidentiality or cybersecurity risks.
- ENTSO-E mentioned that the ERAA should identify sources (including regulatory distortions) of resource adequacy concerns, but that investigating solutions to these concerns shall be a Member State's prerogative pursuant to Article 20(3) of the Electricity Regulation.
- (25) ENTSO-E raised concerns about how a rushed implementation of a very ambitious methodology could damage ENTSO-E's and the ERAA credibility.
- (26) These feedbacks are addressed in section 6.6.

5.3. Consultation of the AEWG

- (27) The AEWG was consulted from 28 August until 4 September. One NRA expressed concerns, which were addressed through minor clarifications. In addition, two NRAs submitted minor clarifications and general remarks.
- (28) A separate consultation process was set up for Ofgem, to enable this regulatory authority to provide views.



6. ASSESSMENT OF THE PROPOSAL

6.1. Legal framework

Articles 23 and 27 of the Electricity Regulation set out the requirements of the ERAA Proposal. In terms of process, the aforementioned provisions require ENTSO-E to carry out a consultation with all the relevant stakeholders and to submit the proposal to ACER by 5 January 2020. In terms of substantive provisions, paragraphs (1), (4) and (5) of Article 23 of the Electricity Regulation provide the minimum elements that the proposed methodology must include. In addition, Articles 31 and 41(2) of the Electricity Regulation provide the legal basis with respect to transparency in the consultation process, towards stakeholders and the general public.

6.2. Consultation and submission of the ERAA Proposal

- (30) Articles 23(7) and 27(2) of the Electricity Regulation require ENTSO-E to consult its proposal with all the relevant stakeholders, including the Member States, the ECG, regulatory authorities and other national authorities, and to duly take the results of the consultation into consideration in its proposal.
- (31) On 5 December 2019, ENTSO-E launched a public consultation ⁶ on the draft 'European Resource Adequacy Assessment Methodology Proposal in accordance with Article 23 of the Electricity Regulation of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity'. This consultation lasted from 5 December 2019 until 30 January 2020, and included a stakeholder workshop on 16 December 2019.
- (32) On 17 April 2020, ENTSO-E organised a stakeholder webinar to present the results of its public consultation and to explain the relevant changes in the ERAA Proposal as a result of feedback received from stakeholders.
- (33) In addition, ENTSO-E regularly informed and consulted ACER, the ECG, the NRAs and other national authorities.
- (34) In line with paragraphs (32) and (33) above, ACER considers that ENTSO-E fulfilled the requirements of Articles 23(7), 27(2), 31 and 41(2) of the Electricity Regulation regarding the consultation of stakeholders.
- (35) Article 23(3) of the Electricity Regulation requires ENTSO-E to submit the ERAA Proposal to ACER by 5 January 2020.
- (36) ENTSO-E submitted the ERAA Proposal on 4 May 2020, which is beyond the submission deadline of 5 January 2020 as indicated in Article 23(6) of the Electricity

⁶ See https://consultations.entsoe.eu/entso-e-general/proposal-for-european-resource-adequacy-assessment/



Regulation. Despite this delay, ACER notes that the Electricity Regulation does not declare a submission after 5 January 2020 as invalid.

(37) Therefore, ACER considers the submission of the ERAA Proposal as valid.

6.3. Compliance of the ERAA Proposal with the substantive requirements of the Electricity Regulation

- (38) The ERAA Proposal partly meets the requirements of Article 23(1) of the Electricity Regulation. The ERAA Proposal allows to assess the overall adequacy of the electricity system at Union level, at the level of the Member States, and at the level of individual bidding zones (Article 1(1)⁷), within a period of 10 years (Article 4(1)(a)). On the other hand, the ERAA Proposal does not identify resource adequacy concerns as the expression "resource adequacy concern" is not defined in it. The necessary amendments in that respect are discussed in section 6.6.9 (see paragraph (110) of this Decision).
- The ERAA Proposal is in line with Article 23(4) of the Electricity Regulation, by specifying, in Article 5(2), that transmission system operators ('TSOs') provide ENTSO-E with the relevant data to carry out the ERAA. Furthermore, Article 5(5) of the ERAA Proposal requires that market participants provide TSOs with the relevant data regarding expected utilisation of the generation resources. Finally, in line with the requirement to carry out the ERAA on an annual basis, Article 9(11) of the ERAA Proposal, in conjunction with recital (4) of the 'Whereas' section of the ERAA Proposal, envisages an annual publication of the ERAA.
- (40) The ERAA Proposal meets the requirements of Article 23(5)(a) of the Electricity Regulation by outlining, in Article 4(1)(h), the minimum requirements on the geographical scope of the ERAA.
- The ERAA Proposal partly meets the requirements of Article 23(5)(b) of the Electricity Regulation. Articles 3 and 6 require ENTSO-E to analyse appropriate central reference scenarios (including an economic viability assessment) and appropriate sensitivities. On the other hand, the ERAA Proposal does not specify that central reference scenarios shall reflect measures to reach electricity interconnection targets. The necessary amendments in that respect are discussed in section 6.6.5 (see paragraph (84) of this Decision).
- (42) The ERAA Proposal meets the requirements of Article 23(5)(c) of the Electricity Regulation as it includes, in Article 3, separate central reference scenarios reflecting the differing likelihoods of the occurrence of resource adequacy concerns which the different types of capacity mechanisms are designed to address.

⁷ In sections 6.3 and 6.4, and unless otherwise described, Article numbers relate to the Proposal.



- (43) The ERAA Proposal partly meets the requirements of Article 23(5)(d) of the Electricity Regulation. While Article 4 of the ERAA Proposal focuses on the contribution of market-based resources to resource adequacy, the contribution of out-of-market capacity resources has not been appropriately reflected, and the Proposal neglects the contribution of some balancing reserves. The necessary amendments in that respect are discussed in section 6.6.8 (see paragraph (109) of this Decision).
- (44) The ERAA Proposal meets the requirements of Article 23(5)(e) of the Electricity Regulation as it anticipates, in Article 5(6), the likely impact of the measures referred to in Article 20(3) of the Electricity Regulation.
- (45) The ERAA Proposal meets the requirements of Article 23(5)(f) of the Electricity Regulation because it includes, in Article 3(5), variants with and without existing or planned capacity mechanisms.
- (46) The ERAA Proposal meets the requirements of Article 23(5)(g) of the Electricity Regulation because it is based on a market model using the flow-based approach, where applicable, as set out in Article 4(6)(e).
- (47) The ERAA Proposal meets the requirements of Article 23(5)(h) of the Electricity Regulation because it applies probabilistic calculations in Article 4(2).
- (48) The ERAA Proposal partly meets the requirements of Article 23(5)(i) of the Electricity Regulation because it refers to a single modelling tool in Article 4(1)(c) only implicitly. The necessary amendments in that respect are discussed in section 6.5 (see paragraph (79)(a) of this Decision).
- (49) The ERAA Proposal meets the requirements of Article 23(5)(j) of the Electricity Regulation because it includes, in Articles 4(1)(b) and 7(1), the 'expected energy not served' and the 'loss of load expectation' indicators.
- (50) The ERAA Proposal partly meets the requirements of Article 23(5)(k) of the Electricity Regulation to identify the sources of possible resource adequacy concerns. The Proposal assesses some sources of resource adequacy concerns, but does not assess whether regulatory distortions could be a source of resource adequacy concern, which thus contradicts paragraph (24). The necessary amendments in that respect are discussed in section 6.6.9 (paragraph (110)) below.
- (51) The ERAA Proposal meets the requirements of Article 23(5)(l) of the Electricity Regulation because it takes into account real network development as specified in Article 3(3)(b).
- (52) The ERAA Proposal meets the requirements of Article 23(5)(m) of the Electricity Regulation because it ensures, in Articles 3 and 4, that the national characteristics of generation, demand flexibility and energy storage, the availability of primary resources and the level of interconnection shall be taken into consideration.



6.4. Compliance of the ERAA Proposal with the procedural requirements of the Electricity Regulation

- (53) The ERAA Proposal meets the requirements of Articles 23(7) and Article 27 of the Electricity Regulation because in Article 9 the process for carrying out ERAA is described.
- The ERAA Proposal partly meets the requirements of Articles 31 and 41(2) of the Electricity Regulation. While Articles 8 and 9 of the ERAA Proposal contains requirements with respect to interactions with stakeholders, especially in the consultation process, these requirements do not fully reflect the need to conduct an extensive consultation process and the obligation to operate in full transparency towards stakeholders and the general public. The necessary amendments in that respect are discussed in sections 6.6.10 and 6.6.12 (see paragraphs (114) and (116) of this Decision, respectively).

6.5. Assessment of the replies received in the public consultation

(55) Responses to the public consultation from Member States, ECG and relevant stakeholders (see paragraph (6) of this Decision) are evaluated in Annex II to this Decision.

6.6. Amendments to the ERAA Proposal

- (56) Further to assessing the compliance of the ERAA Proposal with the legal framework as detailed above and making the necessary amendments to ensure such compliance, ACER also assessed the ERAA Proposal for consistency, robustness and completeness, taking into consideration stakeholders' views. This resulted in substantive amendments which are described in paragraphs (58)-(121).
- (57) Any reference to Articles of the ERAA Methodology in this sub-section relates to the amended version of the ERAA Proposal as approved by ACER provided in Annex I to this Decision.

6.6.1. Amendments to the 'Whereas' section

- (58) ACER found it necessary to amend recital (2) of the 'Whereas' section (related to the relevant European Union legal framework) by adding references to:
 - (a) Regulation (EU) 2019/942;
 - (b) Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing⁸;

⁸ OJ L 312, 28.11.2017, p. 6-53.



- (c) Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration⁹;
- (d) Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency¹⁰; and
- (e) Commission Regulation (EU) 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council¹¹.
- (59) In line with the feedback described in paragraph (14) above, ACER found it necessary to add recital (3) to the 'Whereas' section to clarify that the responsibility to determine the general structure of its own level of security of supply is a Member State's right. ACER believes that such amendment is in line with recital (46) of the 'Whereas' section of the Electricity Regulation and, in general, with the broader EU legal framework.
- (60) ACER found it necessary to add recital (4) to the 'Whereas' section to better reflect the subject matter and scope of the Electricity Regulation.
- (61) ACER found it necessary to add recital (5) to the 'Whereas' section to better reflect the alignment of the ERAA Methodology with the principles regarding the operation of electricity markets envisaged in the Electricity Regulation.
- (62) ACER found it necessary to introduce recital (7) to explain that the ERAA should aim for reliable results reflecting realistic conditions of the electricity market and system.
- (63) ACER found it necessary to amend recitals (8) of the 'Whereas' section to better reflect the aim of the ERAA Methodology in the context of the Electricity Regulation.
- (64) ACER found it necessary to amend recital (9) of the 'Whereas' section to better reflect the link between the ERAA Methodology and national resource adequacy assessments pursuant to Article 24 of the Electricity Regulation.
- (65) ACER found it necessary to amend recital (10) of the 'Whereas' section to better reflect the requirements on transparency of ENTSO-E pursuant to Article 41(2) of the Electricity Regulation.
- (66) ACER found it necessary to introduce recital (12) in the 'Whereas' section to allow temporary methodological simplifications during the gradual implementation of the ERAA (if the ERAA is gradually implemented).

⁹ OJ L 312, 28.11.2017, p.54-85.

¹⁰ OJ L 326, 8.12.2011, p. 1-16.

¹¹ OJ L 163, 15.6.2013, p. 1-12.



6.6.2. Amendments to Article 1: 'Subject matter and scope'

- (67) ACER found it necessary to amend paragraph (3) of Article 1 to clarify the different approaches for explicitly and non-explicitly modelled systems in the ERAA.
- (68) ACER found it necessary to amend paragraph (4) of Article 1 to explicitly require ENTSO-E to carry out the ERAA on an annual basis, in line with Article 23(4) of the Electricity Regulation.

6.6.3. <u>Amendments to Article 2: 'Definition and interpretation'</u>

- (69) ACER found it necessary to amend paragraph (1) of Article 2 to correctly refer to definitions included in Article 3 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation¹², and to refer to other definitions introduced in the relevant EU legal framework detailed in paragraph (2) of the 'Whereas' section of the ERAA Methodology.
- (70) ACER found it necessary to amend paragraph (2) of Article 2 to clarify that in case of inconsistency between a definition from the ERAA Methodology and a definition provided in Regulations and Directives listed in paragraph (1) of Article 2, the latter shall prevail.
- (71) ACER found it necessary, for the sake of correctness and clarity, to amend the following definitions in paragraph (2) of Article 2: 'annual fixed costs', 'demand', 'economic lifetime', 'fixed costs', 'expected energy not served (ENS)', 'net generating capacity (NGC)', 'non-explicitly modelled systems', 'revenue' and variable cost.
- (72)ACER found it necessary for reasons of clarity to introduce, in paragraph (2) of Article 2, the following definitions: 'capacity resource', 'central reference scenarios', 'combined heat and power (CHP)', 'capacity mechanism', 'CNEC', 'cost of new entry (CONE)', 'CONE methodology', 'cost of renewal or prolongation (CORP)', 'economic dispatch (ED)', 'economic viability assessment (EVA)', 'energy only market (EOM)', 'energy not served (ENS)', 'frequency containment reserve (FCR)', 'flow-based', 'frequency restoration reserve (FCR)', 'generation shifting key (GSK)', 'load factor', 'Monte Carlo (MC)', 'MC sample year', 'marked-based capacity resource', 'modelled zone', 'Member State (MS)', 'market time unit (MTU)', 'net transfer capacity (NTC)', 'out-of-market capacity resource', 'Pan-European Climate Database (PECD)', 'Pan-European Market Modelling Data Base (PEMMDB)', 'Power Transfer Distribution Factor (PTDF)', regional coordination centre (RCC)', 'remaining available margin (RAM)', 'renewable energy source (RES)', 'replacement reserve (RR)', 'reliability standard (RS)', 'RS methodology', 'scenario', 'sensitivity', 'study time period', 'Treaty on the Functioning of the European Union (TFEU)',

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¹² OJ L 220, 25.8.2017, p. 1



'target year (TY)', 'ten-year network development plan (TYNDP)', 'value of lost load (VOLL)', 'VOLL methodology' and 'weighted average cost of capital (WACC)'. Some of the added definitions were already present in the glossary (Appendix 1 of the ERAA Proposal). ACER found it necessary to merge the glossary with the definition section, to provide one single location for all definitions, and thereby improve legibility.

6.6.4. Amendments to Article 3: 'Scenario framework'

- (73) ACER found it necessary to amend paragraph (1) of Article 3 to better reflect the duration of the study period and to which extent the ERAA assessment may be linked to the seasonal adequacy assessment pursuant to Article 9 of Regulation (EU) 2019/941.
- (74) In line with the feedback described in paragraph (15) above, ACER found it necessary to amend paragraph (3) of Article 3 to clarify that the assumptions of the central reference scenario shall align with measures and actions defined by Member States pursuant to Article 10(5) of the Electricity Regulation and with implementation plans pursuant to Article 20(3) of the Electricity Regulation. ACER believes that such amendment ensures a consistent assessment of resource adequacy risks, in line with existing or planned actions to mitigate or eliminate indirect restrictions to wholesale price formation, regulatory distortions and market failures.
- (75) ACER found it necessary to amend paragraph (4) of Article 3 to better reflect the application of the EVA to all scenarios and sensitivities. In ACER's view, this amendment ensures robust and consistent results.
- (76) ACER found it necessary to amend paragraph (5) of Article 3 to clarify some features of the two central reference scenarios (e.g. related to the lifetime of capacity mechanisms).
- (77) ACER found it necessary to amend paragraph (6) of Article 3 to better describe the features of additional scenarios and/or sensitivities, and to provide some examples in that respect. The amendment also leaves some freedom for ENTSO-E to define which sensitivities are appropriate.
- ACER found it necessary to amend paragraph (7) of Article 3 to require ENTSO-E to conduct an appropriate sensitivity analysis (and to allow other optional sensitivity analyses) to identify whether indirect restrictions to price formation may constitute possible sources of resource adequacy concerns, in line with Article 23(5)(k) of the Electricity Regulation and with the feedback described in paragraph (24) of this Decision. The ERAA should thus support the identification of sources (including regulatory distortions) of resource adequacy concern. Regardless of the identification of these sources, Member States are responsible for the tasks pursuant to Article 20(1), (2) and (3) of the Electricity Regulation; in this respect, ACER believes that the result from ENTSO-E's sensitivity analysis could be useful input for these Member States' tasks and will facilitate ACER's monitoring tasks pursuant to Article 15(1) of Regulation (EU) 2019/942.



6.6.5. Amendments to Article 4: 'Resource adequacy assessment'

- (79) ACER found it necessary to amend paragraph (1) of Article 4 in order to:
 - (a) clarify that resource adequacy metrics are estimated through the ED, while market entry and exit is modelled through the EVA. ACER also explicitly requires that a single modelling tool shall be used, in line with Article 23(5)(i) of the Electricity Regulation;
 - (b) better reflect the role of storage in the ERAA;
 - (c) request that the expected frequency and magnitude of future climate conditions shall be taken into account in the ENTSO-E Pan European Climate Database ('PECD'). Contrary to what is described in paragraph (17) above, ACER observes that relying on 30 most recent climatic years included in the PECD is one of the options listed in paragraph (1)(f) of Article 4 of ERAA Methodology and is an acceptable fallback approach in line with state-of-the-art approaches in climate modelling, as discussed with and validated by the Copernicus Climate Change Service ('C3S') ¹³. ACER also allows for realistic alternative approaches for climate data in central reference scenarios. ACER observes that, in the context of the ERAA modelling exercise, other scenarios and sensitivities pursuant to Article 3(6)(e) of the ERAA Methodology may rely on climate data beyond the one used for the central reference scenarios. In particular, extreme weather events should be reflected by sensitivities in line with Article 23(5)(b) of the Electricity Regulation;
 - (d) reflect that the ED shall rely on a "perfect foresight" principle, unless the ERAA modelling framework allows for a proper characterisation of imbalances related to unforeseen imbalances; and
 - (e) clarify that non-explicitly modelled zones are represented by fixed time series of energy exchanges through interconnections.
- (80) ACER found it necessary to amend paragraph (2) of Article 4 in order to:
 - (a) better describe how the MC method shall be used for probabilistically assessing the availability of capacity and transmission resources;
 - (b) allow that modelling of outages shall reflect, where possible and applicable, the attractiveness for capacity resources to be available during MTUs when energy not served ('ENS') is likely to occur. ACER considers that, because wholesale market prices are often very high when ENS is likely to occur, capacity resources will usually perceive these MTUs as attractive (because capacity resources may earn a significant profit during these MTUs). As a result, ACER considers that this requirement ensures a realistic modelling of the availability of capacity resources

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¹³ https://climate.copernicus.eu/



- (and thus of ENS). Contrary to what is described in paragraph (19) above, ACER observes that this is not a mandatory modelling feature, as it shall apply only "when possible and applicable" within the ERAA modelling framework; and
- (c) better describe how the combination of climate-dependent variables and outages results in MC sample years shall be performed in the ERAA probabilistic framework.
- (81) ACER found it necessary to amend paragraph (3) of Article 4 in order to:
 - (a) clarify the geographical granularity of demand;
 - (b) clarify that demand time series used in the ERAA shall be calculated on the basis of historical demand time series, considering the stochasticity of climate variables, the impact of climate change, projections of economic growth and penetration of new technologies;
 - (c) clarify that assumptions of explicit and implicit DSR shall be based on best forecast within the concerned time period of the ERAA, in order to ensure consistency with other scenario assumptions;
 - (d) clarify that DSR shall be defined as either:
 - (i) DSR potential and initial installed capacity to allow the market entry or exit of DSR in the EVA; or
 - (ii) exogenous installed DSR capacity;
 - (e) specify that the price-responsive portion of each consumer's demand shall be included as DSR in the ERAA. This portion is excluded from calculating the single VOLL for RS by means of the methodology for calculating the value of lost load pursuant to Article 23(6)(a) of the Electricity Regulation ('VOLL methodology').
 - (f) clarify that estimations of energy efficiency and its effects on the demand curve, as well as demand growth due to economic, technological and social developments shall be based on best forecasts, to ensure consistency with other scenario assumptions.
- (82) ACER found it necessary to amend paragraph (4) of Article 4 in order to:
 - (a) clarify that assumptions shall also consider the current status of capacity resources, to ensure robust scenarios:
 - (b) clarify the constraints related to supply of other non-electricity services (e.g. mustrun of combined heat and power capacity resource units);
 - (c) clarify that climate-dependent electricity generation shall be based on modelled climate conditions, assuming perfect foresight;
 - (d) clarify that non dispatchable climate-dependent electricity generation shall be modelled by combining:
 - (i) net generating capacity for each technology and;



- (ii) time-varying load factors reflecting the spatial and temporal dependency of non dispatchable climate-dependent electricity generation based on climate conditions;
- (e) specify that assumptions on unplanned outages of supply may be refined to reflect how outage rates correlate with market signals, to reflect market functioning; and
- (f) clarify that the modelling of hydro capacity may require an ex-ante optimisation described in Article 4(5).
- (83) ACER found it necessary to amend paragraph (5) of Article 4 in order to:
 - (a) specify the rationale, the operational principles and the constraints of the ex-ante optimisation procedure for hydro capacity referred to in paragraph (82)(f), to ensure consistency with the other modelling assumptions; and
 - (b) clarify the differences in modelling in-the-market and out-of-market batteries.
- (84) ACER found it necessary to amend paragraph (6) of Article 4 in order to:
 - (a) specify that cross-zonal capacities shall also reflect the expected impact of measures to reach electricity interconnection targets, in line with Article 23(5)(b) of the Electricity Regulation;
 - (b) clarify that at least one grid model per target year shall be used for the definition of relevant node-to-hub PTDFs, and that such grid models shall incorporate the relevant grid modifications expected to be operational, to take into account real network development in line with Article 23(5)(l) of the Electricity Regulation;
 - (c) specify that the impact of coordinated validation of cross-zonal capacity on RAM should be taken into account:
 - (d) request that, for each target year, cross-zonal capacities shall at least be estimated separately for winter and summer, to reflect seasonal changes of cross-zonal capacity;
 - (e) clarify that if the CCM allows for specific allocation constraints, such constraints may further restrict cross-zonal trade (on top of the flow-based domains or NTCs). In this case, the allocation constraint value shall be computed in line with the expected CCM, to ensure realistic cross-zonal capacities;
 - (f) request that, for each target year, the dimensioning and procurement of balancing reserves shall be in line with Articles 153 and 157 of Regulation (EU) 2017/1485; and
 - (g) clarify that, unless the modelling framework described in paragraph 1(g) is able to model the use of balancing reserves in relation to the occurrence of imbalances, (part of) FCR and/or FRR may be deducted from the available capacity resources in the ED. Contrary to what is described in paragraph (16) above, ACER believes that, if feasible with the ERAA modelling framework, the modelling of balancing



resources should improve to appropriately take account of the contribution of "all resources" pursuant to Article 23(5)(d) of the Electricity Regulation.

- (85) ACER found it necessary to amend paragraph (7) of Article 4 in order to clarify that non-explicitly modelled systems shall be modelled as exogenous best estimates of cross-zonal exchanges on all borders with modelled zones.
 - 6.6.6. Amendments to Article 5: 'Data collection'
- (86) ACER found it necessary to amend paragraph (4) of Article 5 in order to specify that data used for the ERAA may come from various sources.
- (87) ACER found it necessary to amend paragraph (6) of Article 5 in order to specify that ENTSO-E may also rely on other data (collected in line with Regulation (EU) 543/2013) for calibration purposes.
- (88) ACER found it necessary to amend paragraph (8) of Article 5 in order to specify that reserve requirements shall be separately provided for FCR, FRR and RR per modelled zone.
- (89) ACER found it necessary to amend paragraph (9) of Article 5 in order to clarify that general economic parameters shall be prepared centrally by ENTSO-E, based on available economic expertise at European level and consistently with the ENTSOs' scenarios prepared for the TYNDP.
- (90) ACER found it necessary to amend paragraph (10) of Article 5 in order to require that:
 - (a) the economic and technical data used for ERAA (except the WACC) shall be consistent with the most recent CONE and cost of renewal or prolongation. This requirement ensures consistency with the VOLL/CONE/RS methodology, and thus enables a robust identification of resource adequacy concerns; and
 - (b) for technologies for which no economic and technical data are available, best estimates of these parameters required for the EVA shall be prepared centrally by ENTSO-E.
- (91) ACER found it necessary to amend paragraph (11) of Article 5 to require that the PEMMDB includes:
 - (a) technical and economic data at modelled zone level for all the reference technologies considered in the calculation of CONE and cost of renewal or prolongation;
 - (b) data on already awarded capacity mechanism contracts;
 - (c) system reserve requirements, separately provided for FCR, FRR and RR per each modelled zone, target year and MTU;
 - (d) historical demand time series (with a time resolution at least equal to the MTU) per modelled zone;



- (e) all the relevant technical and economic modelling parameters on several technologies affecting future demand, in order to define consistent demand forecasts in the ERAA; and
- (f) NTCs between explicitly modelled zones, flow-based domains and allocation constraints.
- (92) ACER found it necessary to amend paragraph (12) of Article 5 to require that:
 - (a) the PECD includes data related to recent historical climate years;
 - (b) the PECD is updated before the first ERAA implementation to ensure that up-to-date climate data is used: and
 - (c) the PECD is updated at least every five years to include more recent climate data.

The main requirements to ensure a realistic modelling of climate change have been discussed with and validated by C3S.

- (93) ACER found it necessary to amend paragraph (13) of Article 5 in order to require that ENTSO-E prepares assumptions on harmonised maximum clearing prices (pursuant to Article 10(1-2) of the Electricity Regulation), to ensure a realistic modelling of prices during MTUs when ENS occurs, thus enabling a realistic economic viability assessment.
- (94) ACER found it necessary to amend paragraph (14) of Article 5 requesting that TSOs shall provide ENTSO-E with their best forecast on indirect restrictions to price formation (expected to significantly impact the ED or EVA) and the related mitigating measures pursuant to Articles 10(4-5) and 20(3) of the Electricity Regulation, in order to model a realistic regulatory framework related to price formation. ACER requested that this forecast aligns with actions defined by MSs, to ensure realistic scenarios.
 - 6.6.7. Amendments to Article 6: 'Economic viability assessment'
- (95) ACER found it necessary to amend Article 6 to require assessing the economic viability of all capacity resources (except for capacity resources which are based on exogenous assumptions, as described in paragraph (3) of Article 6). ACER considers that it would be methodologically incorrect to assume *ex-ante* that all capacity resources receiving subsidies are economically viable, because subsidies often only represent a share of all the revenues earned by capacity resources.
- (96) ACER found it necessary to amend paragraph (1) of Article 6 in order to require that the EVA assesses the likelihood of retirement, mothballing, new-build of generation assets and measures to reach energy efficiency, in line with Article 23(5)(d) of the Electricity Regulation.
- (97) ACER found it necessary to amend paragraph (2) of Article 6 to clarify that the EVA may rely on either:
 - (a) an assessment of the economic viability of capacity resources; or



- (b) as a simplification, a minimisation of overall system costs.
- (98) ACER found it necessary to amend paragraph (3) of Article 6 to clarify that the evolution of capacity resources based on exogenous assumptions may not be subject to EVA, because such evolution may fully be defined as an ERAA input.
- (99) ACER found it necessary to amend paragraph (4) of Article 6 to clarify that a capacity resource shall be characterised as economically viable if its total revenues are greater than its total costs.
- (100) ACER found it necessary to amend paragraph (5) of Article 6 to clarify the scope of market entry and exit decisions to be taken based on the economic viability of each capacity resource.
- (101) ACER found it necessary to amend paragraph (6) of Article 6 to clarify that, as a simplification, the EVA may be based on overall system cost minimisation, where the overall cost is defined as the sum of:
 - (a) annualised investment and fixed costs, and
 - (b) total operating costs resulting from the ED.
- (102) ACER found it necessary to require consistency with the CONE and cost of renewal or prolongation values used within the RS methodology, in order to ensure consistency with the RS methodology.
- (103) ACER found it necessary to amend paragraph (9) of Article 6 to require that the revenues considered in the EVA include additional revenue elements to ensure a realistic estimate of the total revenues that capacity resources can expect to earn. In line with the feedback described in paragraph (22) above, ACER believes that the calculation of expected revenues from wholesale electricity markets shall take into account different realistic approaches reflecting hedging opportunities and risk management. In particular, ACER considers that the availability of hedging products which fulfil the hedging needs of specific capacity resources will impact the risk management of these capacity resources. Conversely, a lack of hedging products may impact the risk policy, for example by increasing the WACC. Besides, ACER considers that revenues from peak prices (in line with paragraph (22)), subsidies, capacity mechanisms, or services provided outside the electricity sector should be included, because they impact the economic viability of capacity providers.
- (104) ACER found it necessary to amend paragraph (10) of Article 6 to require that the costs considered in the EVA shall be equal to the sum of all costs expected to be incurred by the capacity resources, consistently with the CONE and cost of renewal prolongation according to the CONE and RS methodologies, and that the costs shall be based on the data described in Article 5(10) of the ERAA Methodology. The consistency requirement ensures a robust identification of resource adequacy concerns. Furthermore, for scenarios with capacity mechanisms in the considered modelled zone and if the capacity resource receives capacity mechanism payments, ACER considers that the WACC may be reduced (if properly justified) to reflect the



- lower risk premium perceived by the owner of the capacity resource (because of guaranteed regular revenues from capacity mechanism payments).
- (105) ACER found it necessary to amend paragraph (12) of Article 6, to clarify that maximum NGC potentials may be defined, in order to ensure that limitations to the development of specific technologies be accurately reflected. In this case, ACER clarified that consistency shall be ensured with the RS methodology to ensure a robust identification of resource adequacy concerns.
- (106) ACER found it necessary to amend paragraph (15) of Article 6, to suggest that the risk management strategy be consistent with the assumptions underlying EENS and LOLE, to ensure overall consistency of the results.
- (107) ACER found it necessary to amend paragraph (16) of Article 6, to clarify that boundary conditions may be introduced to reflect the expected costs and benefits of a capacity resource beyond the time period modelled by the ERAA.
- (108) Given the complexity underlying the implementation of the EVA, ACER found it necessary to introduce paragraphs (18) and (19) in Article 6, in order to allow for temporary simplifications of the modelling, while requesting an experiment to assess the impact of the main EVA assumptions. These paragraphs enable an efficient implementation of the ERAA in the long term. Besides, the implementation timeline was deemed reasonable and achievable by experts from the Joint Research Centre.
 - 6.6.8. Amendments to Article 7: 'Economic dispatch'
- (109) ACER found it necessary to add Article 7 to the ERAA Methodology given that the ED plays a major role in the identification of resource adequacy concerns and significantly impacts the EVA. In particular, this article describes:
 - (a) the scope, the requirements, the characteristics of objective function and constraints of the ED (paragraphs (1)-(5));
 - (b) that forced demand disconnection, as a non-market-based measure, shall be modelled in line with the applicable regulatory framework (paragraph (6)). This requirement ensures a realistic modelling of ENS and its impact on electricity markets;
 - (c) that the ED shall reflect constraints in the activation of strategic reserves pursuant to Article 22(2) of the Electricity Regulation (paragraph (7)). This requirement ensures a realistic calculation of ENS and market prices when strategic reserves are activated, in line with paragraph (16);
 - (d) how the ED shall calculate prices during occurrence of ENS and the list of significant elements the ED shall consider with respect to price formation (paragraphs (8)-(9)). Contrary to what is described in paragraph (20) above, ACER observes that, pursuant to Article 23(5)(e) of the Electricity Regulation, the ERAA shall anticipate the likely impact of the measures adopted pursuant to Articles 10(5) and 20(3) of the Electricity Regulation, including e.g. shortage pricing



functions for balancing energy. Furthermore, in line with paragraph (22), ACER considers that peak prices (e.g. during MTUs when ENS occurs) may significantly affect the economic viability of capacity resources, either directly or indirectly (e.g. by affecting forward prices). Finally, contrary to paragraph (21), the Agency considers that introducing a fixed harmonised maximum clearing price would run counter to Article 10(2) of the Electricity Regulation, which requires an automatic adjustment of the harmonised maximum clearing; when the set limit is expected to be reached

- (e) the list of results the ED simulations shall provide for each Monte Carlo sample and MTU and for each target year (paragraphs (10)-(11)). This list ensures that a minimum amount of information is available to calibrate or assess the behaviour of the ED;
- (f) how the ED shall take into account the activation of out-of-market capacity resources in order to ensure a realistic modelling of the contribution of these capacity resources in line with Article 23(5)(d) of the Electricity Regulation (paragraph (12)). Contrary to paragraph (16), ACER considers that neglecting out-of-market measures would contradict Article 23(5)(d) of the Electricity Regulation; and
- (g) the possibility to calibrate the ED with data collected pursuant to Article 5 of the ERAA Methodology.

6.6.9. Amendments to Article 8: 'Identifying a resource adequacy concern'

- (110) ACER found it necessary to add Article 8 to ensure a robust and realistic identification of resource adequacy concerns pursuant to Article 23(1) of the Electricity Regulation.
- (111) In particular, paragraph (1) of Article 8 specifies that a reliability standard set by the Member State (or by a competent authority designated by the Member State) is necessary in order to identify a resource adequacy concern, because, in line with Article 25(1) of the Electricity Regulation, the reliability standard indicates the necessary level of security of supply. Furthermore, the identification of resource adequacy concerns relies on central reference scenarios because these scenarios combine the best forecast of future market and system conditions, thus ensuring a realistic identification of resource adequacy concerns.
- (112) Paragraph (2) of Article 8 allows assessing whether the reliability standard is fulfilled for other scenarios or sensitivities. Such task allows to better identify the source of resource adequacy concerns (e.g. with respect to the sensitivity related to indirect restrictions to price formation pursuant to Article 3(7)), and allows assessing the impact of extreme weather events, hydrological conditions, wholesale prices, etc. on the fulfilment of the reliability standard.



- (113) Paragraph (3) of Article 8 specifies how to define the possible sources of resource adequacy concerns, e.g. considering the outcome of sensitivities conducted in line with paragraph (78), pursuant to Article 23(5)(k) of the Electricity Regulation.
 - 6.6.10. Amendments to Article 9: 'Stakeholder interaction'
- (114) ACER found it necessary to introduce paragraph (5) in Article 9 to require that consultations shall fulfil the requirements of Article 31 of the Electricity Regulation.
 - 6.6.11. Amendments to Article 10: 'Assessment process'
- (115) ACER found it necessary to amend paragraph (2) of Article 10 to specify a timeline for ENTSO-E's submission of the scenarios, sensitivities, assumptions and results of the ERAA to ACER for approval to ensure a timely approval of these elements.
 - 6.6.12. Amendments to Article 11: 'Transparency requirements'
- (116) In line with the feedback described in paragraph (23) above, ACER found it necessary to add Article 11 to ensure that ENTSO-E operates in full transparency towards stakeholders and the general public, pursuant to Article 41(2) of the Electricity Regulation. These transparency requirements also enable performing tasks pursuant to Article 24 of the Electricity Regulation, Article 61(2)(c) of Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU¹⁴, and Article 3(2) of Regulation (EU) 2019/942. The Article also ensures that the transparency requirements imposed on ENTSO-E are proportionate to the aim pursued (e.g. by only requiring to publish detailed data upon request) and to maintain, where appropriate, the confidentiality of information.
 - 6.6.13. Amendments to Article 12: 'Implementation of the methodology'
- (117) ACER found it necessary to specify an implementation timeline in paragraph (1) of Article 12 to ensure a timely implementation of the ERAA Methodology. This timeline was deemed reasonable and achievable by experts from the Joint Research Centre. In line with the feedback described in paragraph (24) above, ACER believes that the timeline for the implementation of ERAA Methodology shall take into consideration the complexity of the ERAA exercise, and shall allow for a gradual implementation.
- (118) ACER found it necessary to add paragraph (3) to Article 12 to suggest that ENTSO-E assesses and reports on cybersecurity risks related to the implementation of the ERAA Methodology, in line with paragraph (23). This requirement ensures that potential cybersecurity risks are properly assessed and handled.

¹⁴OJ L 158, 14.6.2019, p. 125–199



(119) ACER found it necessary to amend paragraph (4) of Article 12 to specify that the amendment requests to the ERAA Methodology shall fully align with Article 27(4) of the Electricity Regulation.

6.6.14. General amendments

- (120) ACER considers that specifying methodological features of national resource adequacy assessments (including e.g. the interpretation of Article 24(1) of the Electricity Regulation) goes beyond the ERAA Methodology. ACER thus found it necessary to remove requirements related to national resource adequacy assessments.
- (121) ACER found it necessary to remove Appendixes 2 and 3 as they are not referred to in the main body of the Proposal (except when describing the structure of the Proposal).
- (122) Finally, ACER made several editorial changes to the ERAA Proposal with the aim to correct typos and punctuation, to reorganise the text in a more consistent way and to add omitted words in order to improve readability.

7. CONCLUSION

- (123) For the above reasons, ACER considers the ERAA Proposal in line with the requirements of the Electricity Regulation, provided that the amendments described in section 6.6 above are integrated in the ERAA Proposal, as presented in Annex I to this Decision.
- (124) Therefore ACER approves the ERAA Proposal subject to the necessary amendments. Annex I to this Decision sets out the ERAA Proposal as amended and approved by ACER.

HAS ADOPTED THIS DECISION:

Article 1

The methodology for the European resource adequacy assessment in accordance with Article 23(3) of Regulation (EU) 2019/943 is adopted as set out in Annex I to this Decision.



Article 2

This Decision is addressed to ENTSO-E.

Done at Ljubljana, on 2 October 2020.

- SIGNED -

For the Agency
The Director

C. ZINGLERSEN



Annexes:

Annex I – Methodology for the European resource adequacy assessment in accordance with Article 23(3) and (5) of Regulation (EU) 2019/943.

Annex II (for information only) – Evaluation of responses to the public consultation on the amendments of the proposal for a methodology for the European resource adequacy assessment.

Annex III (for information only) – ENTSO-E's comments and proposed changes based on ACER's 22 July preliminary views

In accordance with Article 28 of Regulation (EU) 2019/942, the addressee may appeal against this Decision by filing an appeal, together with the statement of grounds, in writing at the Board of Appeal of ACER within two months of the day of notification of this Decision.

In accordance with Article 29 of Regulation (EU) 2019/942, the addressee may bring an action for the annulment before the Court of Justice only after the exhaustion of the appeal procedure referred to in Article 28 of that Regulation.